

THE TAXONOMY OF SOME INDO-PACIFIC MOLLUSCA

PART 10

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Abstract. *Cronia ozenneana* (Crosse, 1861) has chronological priority over *C. gibba* (Pease, 1865), and the radula of *C. musiva* (Kiener) is illustrated. *Morula porphyrotoma* (Reeve) is placed in synonymy of *M. dumosa* (Conrad) on the basis of its type specimen. The identity and synonymy of *Pascula benedicta* (Melvill & Standen), *Maculotriron serriale* (Deshayes in Laborde & Linant) and *Clivipollia bella* (Reeve), are elucidated from their type specimens. *Latiaxis fenestratus* Kosuge is placed in synonymy of *L. wormaldi* Powell and the type-specimen of *L. sibogae* Schepman, is illustrated. *Nassaria incerta* (King) and *Trajana woodringi* E.H. Vokes, are additional fossil species of the *Trajana-Nassaria* group, and the Australian *Nassaria problematica* (Iredale) is tentatively reported from New Zealand waters. The radula is illustrated and a new range-extension recorded for *Nassarius crebricostatus* (Schepman), and ovoviviparity is reported in *N. tabescens* (Marrat). New range-extensions are recorded for *Mitra subflava* (Kuroda & Habe), *M. vexillum* Reeve, and *Ziba rehderi* (Webb), and *Mitra pudica* (Pease) is re-assigned from the genus *Pterygia* to *Mitra* on the basis of its radular anatomy.

Family MURICIDAE

Subfamily THAIDINAE

Genus *Cronia* H. & A. Adams, 1853

Cronia H. & A. Adams, 1853, Gen. Rec. Moll. 1:128. Type species by M *Purpura amygdala* Kiener, 1835. Recent, Indo-Pacific.

Cronia ozenneana (Crosse, 1861)

(Figs. 1-3)

1861. *Ricinula ozenneana* Crosse, J. Conchyl. 9:285; 1862 Crosse, J. Conchyl. 10:49, pl. 1, figs. 4, 5.
1865. *Latirus gibbus* Pease, Proc. Zool. Soc. Lond. p. 54; 1868 Pease, Americ. J. Conch. 3(4):279, pl. 23, fig. 17.
1873. *Murex crossei* Lienard, J. Conchyl. 21:285; 1874 Lienard, J. Conchyl. 22:70, pl. 1, fig. 2.
1904. *Coralliophila dissimulans* Preston, J. Malac. 11(4):77, pl. 7, figs. 5, 6.
1979. *Cronia gibba* (Pease), Cernohorsky, Rec. Auckland Inst. Mus. 16:172, figs. 6-10 (shells), fig. 11 (radula).

TYPE LOCALITY. None (*ozenneana*); Howland I, Pacific Ocean (*gibba*); Mauritius (*crossei*); Ceylon (*dissimulans*).

Type specimens. The holotype and 1 immature paratype of *Cronia ozenneana* (Crosse) are in the Muséum National d'Histoire Naturelle, Paris, dimensions of holotype length 14.5 mm, width 9.4 mm (Figs. 1,2) and paratype length 14.4 mm, width 9.5 mm (Fig. 3).

Cernohorsky (1979) reviewed the nomenclature of *Cronia gibba* (Pease) and illustrated the type specimens of the species. Further research, however, has turned up another prior name for the species and from examination of the type of *C. ozenneana* it is obvious that this taxon will have to replace *C. gibba* (Pease).

Genus *Morula* Schumacher, 1817

Morula Schumacher, 1817, Essai nouv. syst. pp. 68, 227. Type species by *M. papillosa* Schumacher, 1817 = *Drupa uva* Röding, 1798.

Morula musiva (Kiener, 1836)

(Figs. 4, 10, 11)

1836. *Purpura musiva* Kiener, Spéc. gén. icon. coq. viv. 8:38, pl. 9, fig. 2.

TYPE LOCALITY. None.

The shell of this species has the appearance of a typical *Morula* (Fig. 4), however, the radula is of the *Cronia* type. The radular ribbon is 3.8 mm long in a shell 23.1 mm in length, and has 174 rows of teeth + 6 rows of nascentes (Figs. 10, 11). The rachidians lack the 2-3 small side denticles which are present in the radula of *M. uva* (Röding, 1798), the type-species of *Morula*. However, in some individuals of *M. granulata* (Duclos), the side denticles become obsolete.

Morula dumosa (Conrad, 1837)

(Figs. 5-9)

1837. *Purpura dumosa* Conrad, J. Philad. Acad. Sci. 7:267, pl. 20, fig. 20.

1846. *Ricinula prophyrostoma* Reeve, Conch. Icon. 3:pl. 2, sp. 7.

1868. *Engina dumosa* Conrad, Pease, Americ. J. Conch. 4(3):123.

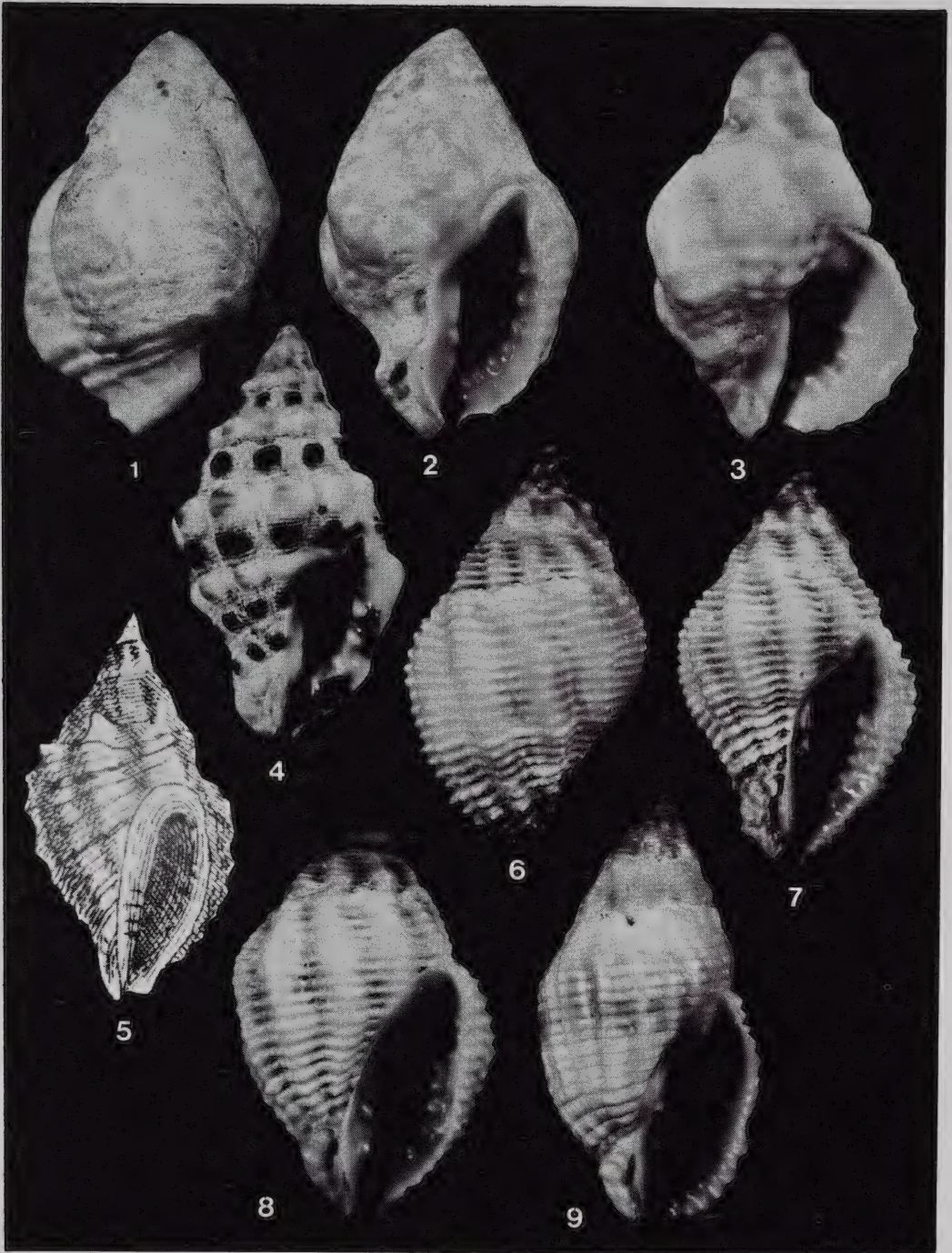
1880. *Ricinula (Sistrum) dumosa* Conrad, Tryon, Man. Conch. 2:188, pl. 58, figs. 243, 245 only.

1952. *Morula porphyrostoma* (Reeve), Tinker, Pacific sea shells p. 90, plate facing p. 90, cent. fig. top row; 1957 Kaicher, Indo-Pacific seashells, pl. 3, fig. 9.

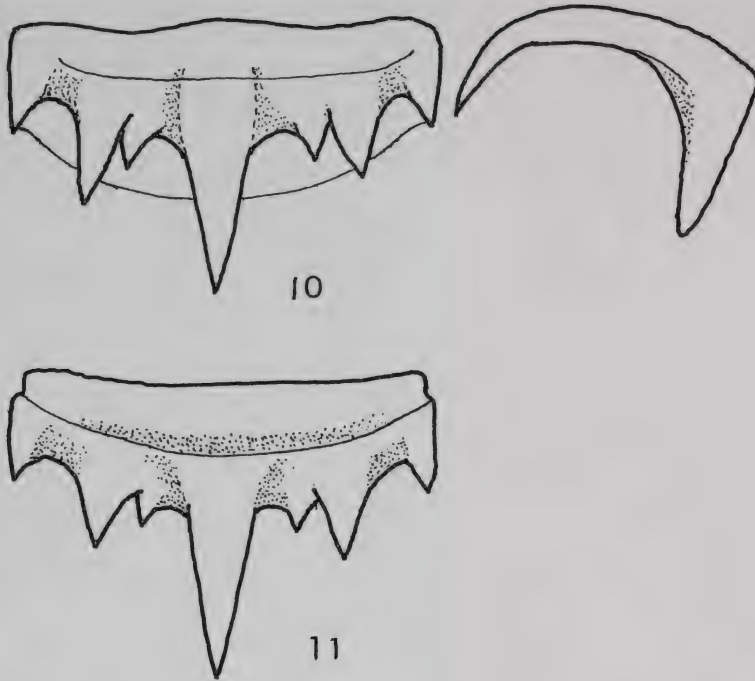
1979. *Morula dumosa* (Conrad), Kay, Hawaiian mar. shells, sect. 4:247, fig. 87C.

TYPE LOCALITY. None (*dumosa*); Marquesas Is (*porphyrostoma*).

Type specimens. The type specimen of *Purpura dumosa* Conrad, can no longer be located at the Academy of Natural Sciences, Philadelphia (Dr R. Robertson, *in litt.*). Four syntypes of *Ricinula prophyrostoma* Reeve, are in the British Museum (Nat. Hist.), London, No. 1980128, and the specimen measuring length 17.8 mm, width 10.9 mm, height of aperture 11.4 mm, is here designated as the lectotype (Figs. 6, 7). The lectotype has 6 whorls, 9 axial folds and 7 spiral cords on the penultimate and 9 folds and 18 cords on the body whorl, siphonal fasciole with 2 extra cords, outer lip with 7 denticles, lower half of columella with 4 denticles. Colour is grayish-white, aperture purple.



Figs. 1-9. 1-3 *Cronia ozenneana* (Crosse). 1,2. Holotype MNHN Paris; 14.5 mm. 3. Paratype MNHN Paris; 14.4 mm. 4. *Morula musiva* (Kiener). Tonga Is; 23.1 mm. 5-9. *M. dumosa* (Conrad). 5. Type-figure. 6-9. *Ricinula porphyrostoma* Reeve. 6,7. Lectotype BM(NH) No.1980128; 17.8 mm. 8. Paralectotype BM(NH); 18.2 mm. 9. Immature paralectotype BM(NH); 21.9 mm.



Figs. 10,11. *Morula musiva* (Kiener). Vavau, Tonga Is. 10. Half-row of radula. 11. Anterior view of rachidian tooth.

Already last century Pease (1868) realized that *dumosa* Conrad and *porphyrostoma* Reeve, were the same species. Kay (1979), however, considers *porphyrostoma* Reeve to be a separate species with a spinose rather than scalar sculpture and an ovate rather than pyriform shape. Since Conrad's type specimen is no longer extant a comparison can only be made between Conrad's (1837) mediocre type figure (Fig. 5) and description, and Reeve's existing syntypes of *porphyrostoma*, and the conclusion is that they are conspecific. Reeve's lectotype of *porphyrostoma* is almost identical in shape to the specimen illustrated by Kay as *dumosa* (op.cit., fig.87C), and the immature paralectotype of *porphyrostoma* has a more elongate form and spiral grooves instead of spiral cords (Fig. 9).

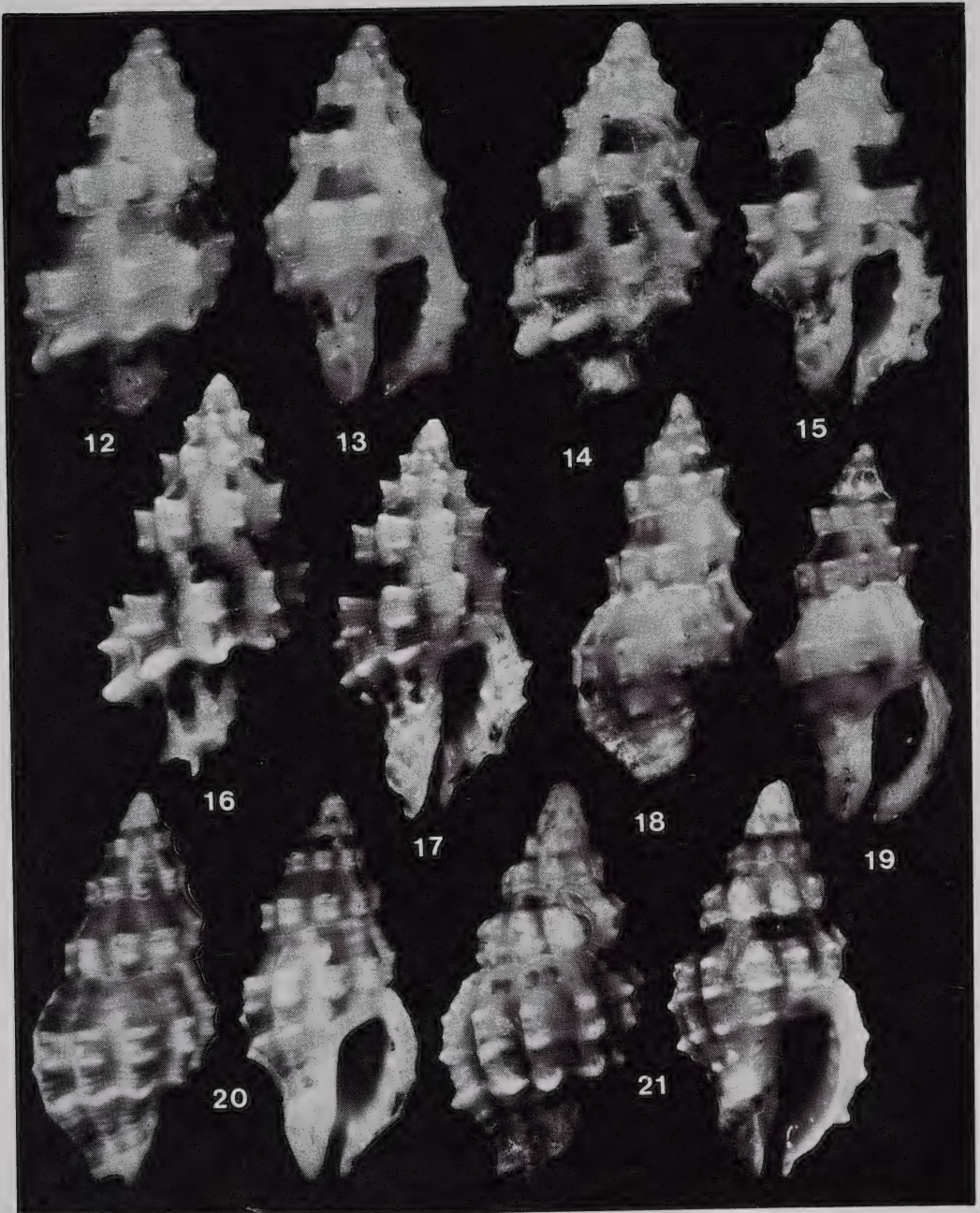
Genus *Pascula* Dall, 1908

Pascula Dall, 1908, Bull.Mus.Comp.Zoology Harvard 43(6):311. Type species by *M Trophon* (*Pascula*)*citricus* Dall,1908. Recent, Easter I, Pacific.

Pascula benedicta (Melvill & Standen,1895)

(Figs. 12-20)

- 1895. *Murex (Ocinebra) benedictus* Melvill & Standen, J.Conch. 8:108,pl.2,fig.13.
- 1903. *Pentadactylus paucimaculatus* Sowerby, Ann.Mag.Nat.Hist. (7), 12:496.
- 1952. *Drupa benedicta* (Melvill & Standen), Kuroda & Habe, Check-list & Bibl. mar.moll.Japan, p.54.
- 1952. *Drupa paucimaculata* (Sowerby), Kuroda & Habe, *ibid.*, p.54.
- 1960. *Drupa (Morulina) benedicta* (Melvill), Azuma, Cat.Moll.Shikoku, Japan, p.35.
- 1960. *Drupa (Morulina) paucimaculata* (Sowerby), Azuma, *ibid.*, p.35.



Figs. 12-21. 12-17. *Pascula benedicta* (Melvill & Standen). 12,13. Holotype UM Manchester; 6.4 mm. 14,15. Specimen from Moruroa Atoll, Tuamotu Archipelago; 6.1 mm. 16,17. Specimen from Guam I, Marianas Is; 7.1 mm. Figs. 18-20. Forma *paucimaculata* Sowerby. 18,19. Holotype BM(NH); 11.8 mm. 20. Specimen from unknown locality, NM Wales; 9.2 mm. 21. *P. cf. citrica* (Dall). Punta Engano, Mactan, Philippines; 11.1 mm.

TYPE LOCALITY. Lifu, Loyalty Is (*benedicta*); Hachijojima, Izu, Japan (*paucimaculata*).

Type specimens. The holotype of *Murex benedictus* Melvill & Standen, is in the University of Manchester Museum, length 6.4 mm, width 3.3 mm. The type has 6 mature whorls and a partly worn protoconch, 8 axial ribs, 2 rows of nodes and 7 spiral striae on the penultimate and 9 axial ribs, 3 main rows of nodes + 3 nodulose cords and *c.* 17 fine striae on the body whorl; the outer lip has 5 denticles and the columella 2 minute denticles anteriorly; colour is white with a few reddish-brown blotches (Figs. 12,13).

The holotype of *Pentadactylus paucimaculatus* Sowerby, is in the British Museum (Nat.Hist.), London, length 11.8 mm, width 5.3 mm. There are 5 mature whorls and 3 smooth embryonic whorls, 9 axial ribs and 2 rows of nodes on the penultimate and 9 axial ribs, 3 main rows of nodes + 2 nodulose cords and some fine intermediate spiral striae on the body whorl; the outer lip has 8 small denticles and the columella 1 obsolete denticle anteriorly; although faded, orange-brown blotches are still discernible (Figs. 18,19).

The species has been reported from Japan in recent years but has not been illustrated nor have additional records been reported. The species is variable in form, and a better specimen of the slender *paucimaculata* form from unknown locality from the Cox collection in the National Museum of Wales, Cardiff, shows the large areas of brown on a creamy-white background and additional spiral lines (Fig. 20). A very small, 6.1 mm long individual closely resembling the holotype of *benedicta* has been collected at Moruroa Atoll, Tuamotu Archipelago (*leg.* C.Beslu) [Figs. 14,15], while an intermediate form has been found on Anae I, Guam I, Marianas Is (*leg.* Dr Munroe) [Figs. 16,17]. Fresh specimens show a macroscopic sculptural pattern of very fine axial and spiral striae with a fine net-like effect, the spiral nodes are frequently echinate and most prominent upon the axial ribs with the third anterior row of nodes on the body whorl usually the most pronounced; the aperture is white and occasionally tinged with violet and the protoconch has 3-3½ smooth, conical whorls.

Rehder (1980) discussed the status of *Pascula* Dall at length and also illustrated the lectotype of *P.citricus* Dall. I agree with Rehder's conclusions that the genus *Pascula* is closer in radular and shell characters to the *Morula-Cronia* group of species in the subfamily Thaidinae rather than *Trophon* in the Trophoninae or *Muricopsis* in the Muricopsinae. *Murex benedictus* also belongs to the *Pascula* group since it closely resembles *P.citrica*. A specimen of a species very similar or conspecific with *P.citrica* from Punta Engano, Cebu, Philippines, is here illustrated (Fig. 21).

Genus **Maculotriton** Dall, 1904

Maculotriton Dall, 1904, Smithsonian misc.coll. 47(1475): 136. Type species by OD *Triton bracteatus* Hinds, 1844 = *Buccinum serriale* Deshayes in Laborde & Linant, 1834. Recent, Indo-Pacific.

Maculotriton serriale (Deshayes in Laborde & Linant, 1834) (Figs. 22-30)

1834. *Buccinum serriale* Deshayes in Laborde & Linant, Voy.L'Arabie Pétrée, p.66, figs.32-34; 1926 Lamy, Bull.Mus.Hist.Nat.Paris 32(2):382; 1928 Tomlin & Salisbury, Proc. Malac.Soc.Lond. 18:33,35.

1844. *Triton angulatus* Reeve, Conch.Icon. 2:pl.19,sp.88 (publ.June 1844).

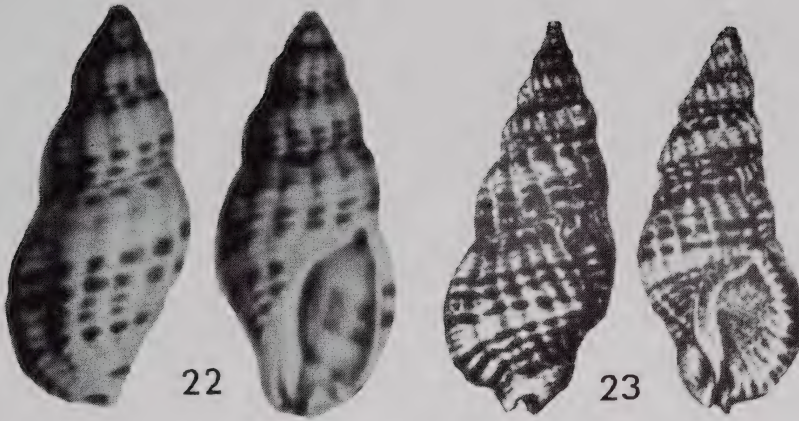
1844. *Triton bracteatus* Hinds, Proc.Zool.Soc.Lond. pt.12:21 (publ.July 1844); 1844 Hinds, Zool.voy.H.M.S. "Sulphur", pt.1:11, pl.4,figs.5,6.
1848. *Colombella epidelia* Duclos in Chenu, Illust.Conchyl. pl.25,figs.17,18.
1872. *Tritonidea petterdi* Brazier, Proc.Zool.Soc.Lond. p.22; 1901 Tate & May, Proc.Linn.Soc. N.S.W. 26(3):450.
1881. *Triton(Epidromus)bracteatus* Hinds, Tryon, Man.Conch. 3:29,pl.15,fig.141.
1896. *Clathurella* (?) *waterhouseae* Brazier, Proc.Linn.Soc.N.S.W. 21(3):345.
1899. *Clathurella waterhouseae* Brazier, Hedley, Proc.Linn.Soc.N.S.W. 24(3): 434, fig.7.
1904. *Maculotriton bracteatus* (Hinds), Pilsbry & Vanatta, Proc.Acad.Nat.Sci.Philad. 56:593, fig.3 (radula); 1906 Hedley, Proc.Linn.Soc.N.S.W. 30(4):529; 1915 Oliver, Trans. N.Z.Inst. 47:534; 1952 Tinker, Pacific sea shells, p.102, pl.opposite, figs.top row; 1972 Ponder, J.Malac.Soc. Australia 2(3):226, pl.23,figs.1-5 (shell),figs.1/5, 1/6 (radula) [figd. holotype of *petterdi* and *waterhouseae*]; 1979 Kay, Hawaiian mar.shells Sect.4:246,figs. 871, J.
1904. *Maculotriton bracteatus longus* Pilsbry & Vanatta, Proc.Acad.Nat.Sci.Philad. 56:595; 1905 Pilsbry, Proc.Acad.Nat.Sci.Philad. 57:103,pl.3, fig.13; 1964 Habe, Shells west.Pacific col. 2:83,pl.27, fig.4.
1933. *Colubraria bracteata* Hinds, Dautzenberg & Bouge, J.Conchyl. 77:256.
1952. *Drupa serrialis longus* (Pilsbry & Vanatta), Kuroda & Habe, Check-list & Bibl.rec.mar.Moll.Japan, p.54; 1967 Habe & Kosuge, Stand.book Jap. shells col. 3:69, pl.27,fig.8.
1956. *Maculotriton bracteata* (Hinds), Cotton, Malac.Club Victoria Publ. No.1:4, fig.17; 1974 Dance, Encycl.shells p.129, bottom figs.
1960. *Drupa(Maculotriton)serrialis longus* (Pilsbry & Vanatta), Azuma, Cat. Moll.Shikoku, Japan p.35.
1967. *Maculotriton serriale* (Deshayes in Laborde), Orr-Maes, Proc.Acad.Nat.Sci.Philad. 119:132, pl.12,fig.L; 1972 Cernohorsky, Mar.shells Pacific 2:129,pl.36,fig.11; 1975 Salvat & Rives, Coquill.Polynésie, p.317,fig.217; 1978 Hinton, Guide Austral.shells, pl.38,fig.23.
1981. *Drupa(Maculotriton)serriale* (Deshayes in Laborde), Robertson, Tryonia No.4:6.

Synonymy of forma *digitalis* Reeve

1844. *Triton digitalis* Reeve, Conch.Icon. 2:pl.19,sp.86 (publ.June 1844).
1844. *Triton lativaricosus* Reeve, *ibid.* 2:pl.19,sp.90 (publ.June 1844).
1844. *Triton bacillum* Reeve, *ibid.* 2:pl.19,sp.94 (publ.June 1844).
1904. *Maculotriton digitalis* (Reeve), Pilsbry & Vanatta, Proc.Acad.Nat.Sci.Philad. 56:593,fig.1 (protoconch), fig.2 (radula).
1907. *Eutriton(Epidromus)digitalis* Couturier, J.Conchyl. 55(2):147,pl.2, figs.4,5.
1907. *Eutriton(Epidromus)digitalis* var.*seurati* Couturier, *ibid.* 55(2):147, pl.2,figs. 6-8.
1933. *Colubraria digitalis* (Reeve), Dautzenberg & Bouge, J.Conchyl. 77:256.
1957. *Maculotriton digitalis* (Reeve), Demond, Pacific Science 11:313,fig.21; 1967 Orr-Maes, Proc.Acad.Nat.Sci.Philad. 119:131,pl.12,fig.M.
1960. *Drupa(Maculotriton)digitalis* (Reeve), Azuma, Cat.Moll.Shikoku,Japan,p.35.

TYPE LOCALITY. Red Sea (*serriale*); Ticao I, Philippines (*angulatus*); Capul I, Philippines (*digitalis*); none (*lativaricosus*; *bacillum*; *epidelia*); Straits of Malacca, Indonesia (*bracteatus* — here restricted); N.E. coast of Tasmania = error; actually from Bird I, N.E. Australia (*petterdi*); N.Head of Botany Bay, N.S.W., Australia (*waterhouseae*); Tanabe, Kii, Japan (*longus*); Rikitea; Marutea, Gambier Is, Polynesia (*seurati*).

Distribution. Red Sea to Japan, Eastern Australia, Hawaii and the Marquesas Islands.

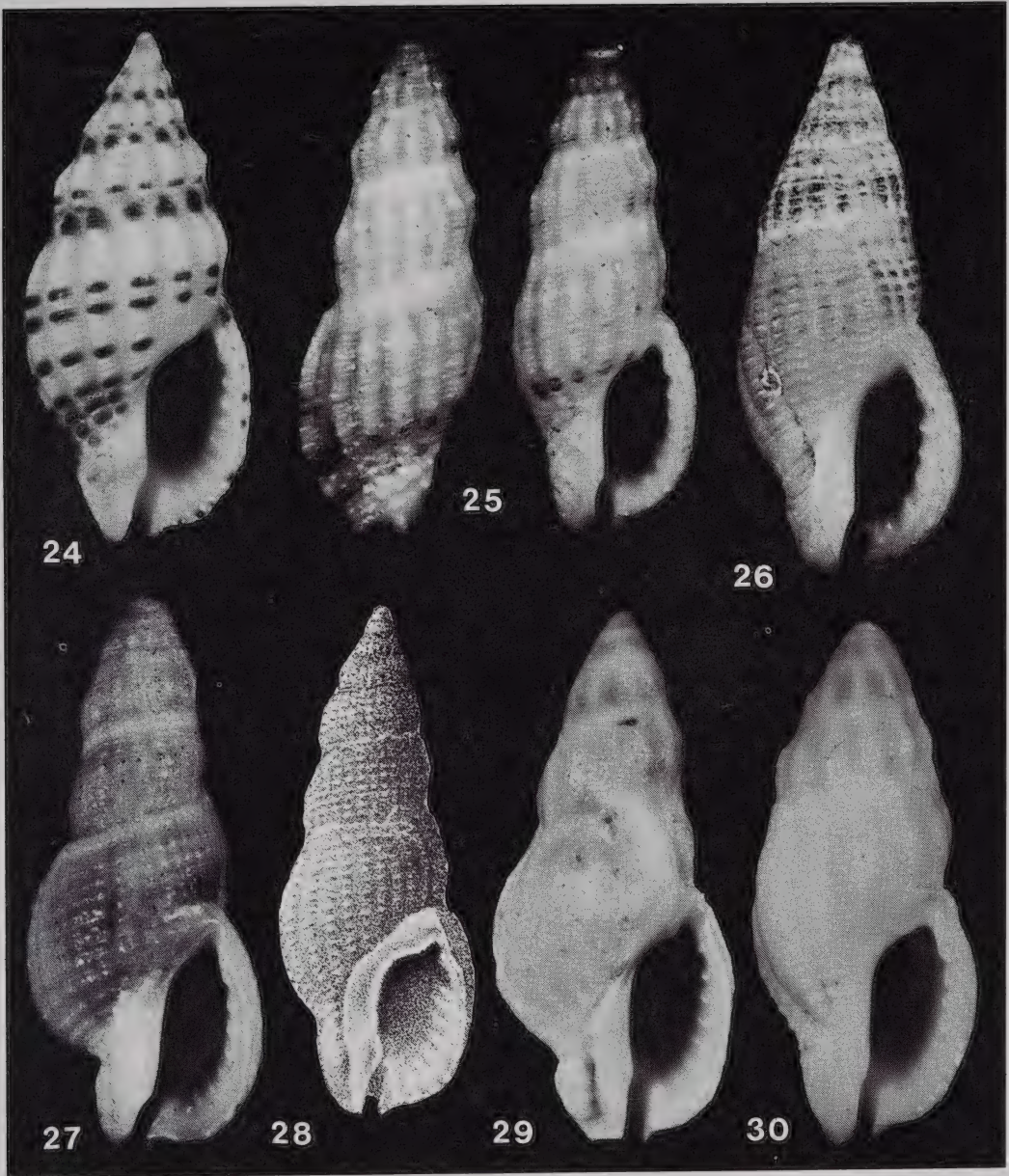


Figs. 22,23. *Maculotriton serriale* (Deshayes). 22. Illustrated lectotype (from Deshayes in Laborde & Linant, 1834, figs.32,33). 23. Illustrated lectotype of *Triton bracteatus* Hinds (from Hinds, 1884, pl.4, figs.5,6).

Type specimens. The type specimen of *Buccinum serriale* Deshayes, can no longer be found in the Museum National d'Histoire Naturelle, Paris (Dr P. Bouchet, *in litt.*), and the type specimen of *Triton bracteatus* Hinds, which should be in the British Museum (Nat.Hist.), London, is no longer extant either (Ms K. Way, *in litt.*). The species respective type-figures are here designated as being representative of the lectotypes (Figs. 22,23). The following type specimens are in the British Museum (Nat.Hist.), London: The holotype of *Triton digitalis* Reeve, No.1967645, dimensions 12.7 x 5.0 mm (Fig. 26), and the holotype of *T.angulatus* Reeve, No.1908058, dimensions 12.2+ x 4.6 mm (Fig. 25); three syntypes of *T.lativaricosus* Reeve, No.198059, and the illustrated syntype, dimensions 21.4 x 9.6 mm, is here designated as the lectotype (Fig. 29); two syntypes of *T.bacillum* Reeve, No.1967648, and the illustrated syntype, dimensions 20.5 x 8.6 mm, is here designated as the lectotype (Fig. 27).

Maculotriton serriale is a very variable, common intertidal muricid gastropod from the Indo-Pacific region which is found on the underside of coral rocks, usually within the intertidal zone. Due to its high variability of shell characters it had a confused taxonomic history and received no fewer than 11 names. Some recent authors (Ponder 1972; Dance & Cameron 1974; Kay 1979) continue using *M.bracteatus* (Hinds), despite earlier papers by Lamy (1926) and Tomlin & Salisbury (1928) pointing out the chronological priority of *M.serriale*. The synonymous taxa *Triton angulatus*, Reeve, 1844, *T.digitalis*, Reeve, 1844, *T.bacillum* Reeve, 1844, and *T.lativaricosus* Reeve, 1844, have a 1 month chronological priority over *M.bracteatus* (Hinds).

Orr-Maes (1967) doubted that *M.digitalis* should be separated from *M.serriale* since both occurred on seaward reefs at Coso-Keeling I, and many intermediate forms linking the two were recorded. Ponder (1972) added 2 synonyms to the species-group under discussion by illustrating the type-specimens of *Tritonidea petterdi* Brazier and *Clathurella waterhouseae* Brazier, and pointed out that *M.digitalis* (Reeve) may prove to be a synonym of *M.bracteatus* (=serriale). Other authors either separate or combine the two forms.



Figs. 24-30. *Maculotriton serriale* (Deshayes). 24. Ventricose specimen resembling type-figure from Guam I, Marianas Is; 15.2 mm. 25. Holotype of *Triton angulatus* Reeve, BM(NH) No. 198058; 12.2 + mm. 26. Holotype of *T. digitalis* Reeve, BM(NH) No. 1967645; 12.7 mm. 27. Lectotype of *T. bacillum* Reeve, BM(NH) No. 1967648; 20.5 mm. 28. Type-figure of *Eutriton digitalis* var. *seurati* Couturier (from Couturier, 1907, pl.2, fig.7). 29,30. *Triton lativaricosus* Reeve. 29. Lectotype BM(NH) No.1980059; 21.4 mm. 30. Paralectotype BM(NH); 17.5 mm.

M. serriale varies greatly in shape, sculpture and colouring. Whorls range from inflated convex to almost flat and many individuals are weakly subangulate anterior to the sutures. Sculpture is fine or coarse and mature specimens frequently form one or more varices. The general colour pattern consists of a few spiral rows of reddish-brown spots upon the laterally elongated nodules on a greyish-white background, but the spots are frequently obsolete and many individuals are uniformly greyish-white or fawn in colour.

The taxa *Triton angulatus* Reeve, *T. bacillum* Reeve, and *T. lativaricosus* Reeve, are added to the synonymy of *Maculotriton serriale* on the basis of the identity of their type-specimens.

Family CORALLIOPHILIDAE

Genus **Latiaxis** Swainson, 1840

Latiaxis Swainson, 1840, Treat. Malac. p. 306. Type species by *M. Pyruia mawae* Gray in Griffith & Pidgeon, 1834. Recent, Indo-Pacific.

Latiaxis wormaldi Powell, 1971

(Figs. 31-33)

1971. *Latiaxis wormaldi* Powell, Rec. Auckland Inst. Mus. 8:220, figs. 15, 16; 1979 Powell, New Zealand Moll. p. 182, pl. 35, figs. 3, 4.

1980. *Latiaxis*(*Echinolatiaxis*)*fenestratus* Kosuge, Bull. Inst. Malac. Tokyo 1(3):42, pl. 10, figs. 10, 11.

TYPE LOCALITY. E. S. E. of Poor Knights Is, New Zealand, 329 m (*wormaldi*); off Mactan, Cebu, Philippines (*fenestratus*).

Type specimens. The holotype of *L. wormaldi* Powell, is in the Auckland Institute and Museum No. TM-1329, dimensions length 22.7 mm, width 19.8 mm (Figs. 31, 32). The holotype of *L. fenestratus* Kosuge, is in the Institute of Malacology, Tokyo, No. IMT-80-10, length 28.7 mm, width 19.5 mm (Fig. 33).

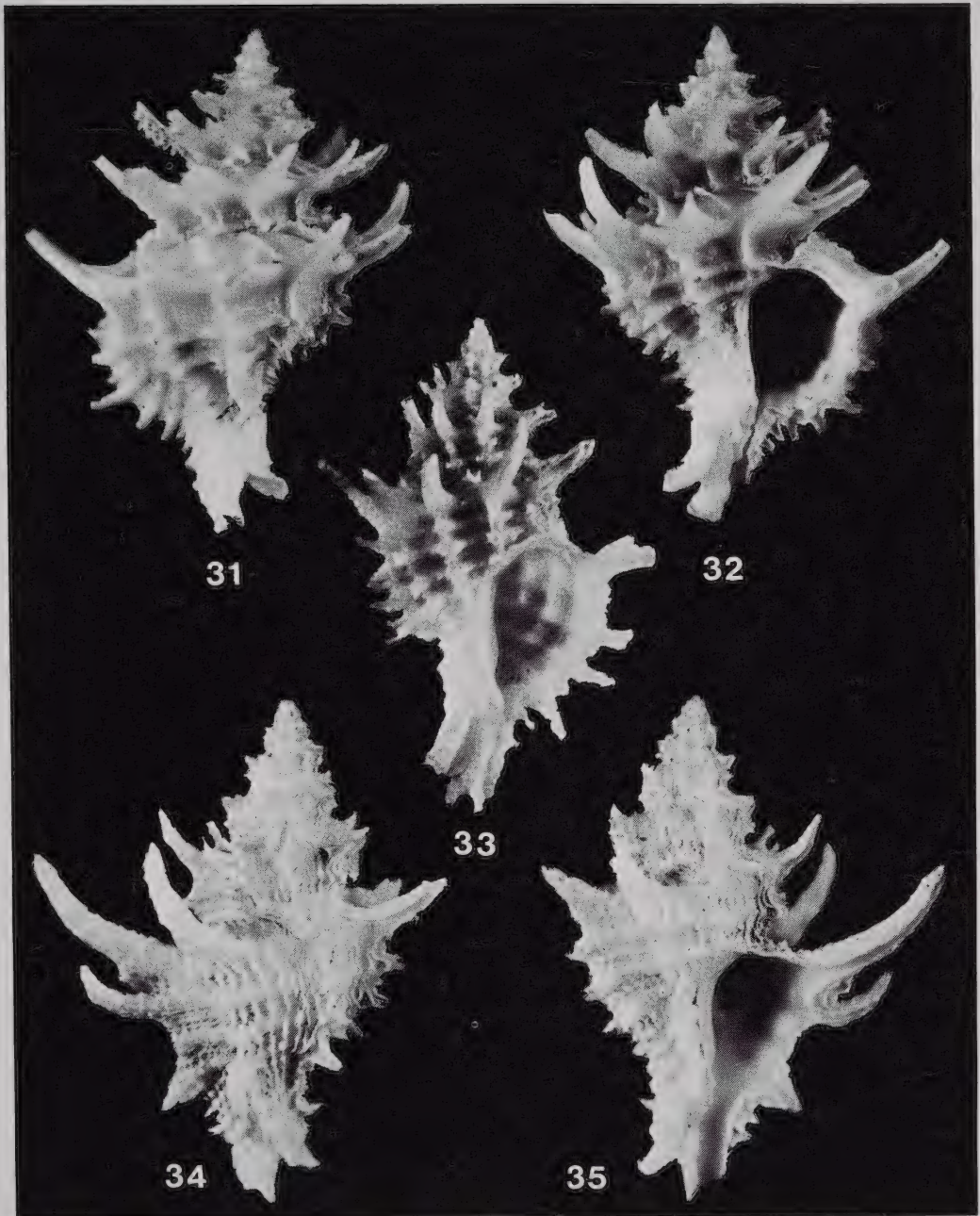
Although described as a new species from the Philippines, the holotype of *L. fenestratus* is a somewhat more slender individual of *L. wormaldi*. The paratype of *L. fenestratus*, however, (width-ratio 89%) is even broader than the holotype of *L. wormaldi* (width-ratio 87%). *L. sibogae* Schepman, 1911, from Indonesia, is similar to *L. wormaldi* but differs in its rougher sculpture of squamate lamellae and absence of brown colouring in the concave portion between axial and spiral sculpture (Figs. 34, 35).

Family BUCCINIDAE

Genus **Cantharus** Röding, 1798

Subgenus **Clivipollia** Iredale, 1929

Clivipollia Iredale, 1929, Austral. Zool. 5(4):347. Type species by *M. C. imperita* Iredale, 1929 = *Ricinula pulchra* Reeve, 1846. Recent, Indo-Pacific.



Figs. 31-35. 31-33. *Latiaxis wormaldi* Powell. 31,32. Holotype AIM No. TM-1329; 22.7 mm. 33. Holotype of *L.fenestratus* Kosuge; 28.7 mm (from Kosuge, 1980, pl.10,fig.10). 34,35. *L.sibogae* Schepman. Holotype ZM Amsterdam: 16.4 mm.

Cantharus (Clivipollia) fragaria (Wood, 1828)

(Fig. 36)

1828. *Voluta fragaria* Wood, Suppl. Index Testac. p.11, pl.3, fig.27a.
 1828. *Buccinum fragaria* Wood, *ibid.* p.31.
 1840. *Turbinella carolinae* Kiener, Spéc.gén.icon.coq.viv. 6:47, pl.18, fig.1; 1876 Kobelt, Syst. Conch.-Cab. Martini & Chemnitz ed.2, 3(3A):50, pl.9a, figs.9,10.
 1846. *Ricinula bella* Reeve, Conch. Icon. 3:pl.3, sp.15.
 1868. *Engina bella* Reeve, Pease, Americ.J. Conch. 4(3):123; 1975 Salvat & Rives, Coquill. Polynesie p.319, fig.224.
 1952. *Engina carolinae* (Kiener), Kuroda & Habe, Check-list & Bibl. rec. mar. Moll. Japan, p.55.
 1964. *Clivipollia fragaria* (Wood), Hawaiian Shell News 12(10):2, figs.3,4; 1974 Quirk & Wolfe, Seashells Hawaii p.12, lower pl., fig.2; 1979 Kay, Hawaiian mar. shells Sect.4:263, fig.92E.
 1967. *Peristernia fragaria* (Wood), Orr-Maes, Proc. Acad. Nat. Sci. Philad. 119(4):136, pl.13, fig.E.
 1974. *Engina elegans* Dunker, Dance & Cameron, Encycl. shells p.142, figs. bottom left column (non *Turbinella elegans* Dunker in Kobelt, 1876).

TYPE LOCALITY. None (*fragaria* and *carolinae*); Capul I, Philippines (*bella*).

Type specimens. Three syntypes of *Ricinula bella* Reeve, are in the British Museum (Nat. Hist.), London, No. 1980131, and the illustrated syntype, length 19.9 mm, width 10.2 mm, is here designated as the lectotype (Fig. 36).

This well known species from the tropical Indo-Pacific region has received a mixed treatment in malacological literature and has been variously placed in the genera *Voluta*, *Buccinum*, *Turbinella*, *Ricinula*, *Engina*, *Peristernia* and *Clivipollia*. Even recent authors identify the species as either "*Engina elegans* Dunker" (Dance & Cameron 1974) or "*Engina bella* Reeve" (Salvat & Rives 1975). *Turbinella elegans* Dunker in Kobelt, 1876, which is a primary homonym of *T. elegans* Grateloup, 1847, is actually the species *Cantharus (Clivipollia) pulcher* (Reeve, 1846). The type-series of *Ricinula bella* Reeve, is undoubtedly the species *fragaria* Wood.

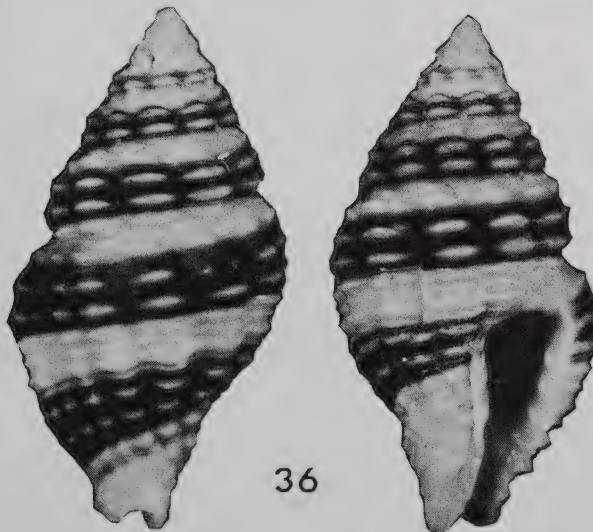


Fig. 36. *Cantharus (Clivipollia) fragaria* (Wood). Lectotype of *Ricinula bella* Reeve, BM(NH) No.1980131; 19.9 mm.

Genus *Nassaria* Link, 1807

Nassaria Link, 1807, Besch. Nat.-Samml. Univ. Rostock p. 123. Type species by SD (Eames, 1952)
N. lyrata Link, 1807 = *Neptunea pusilla* Röding, 1798. Recent, Indo-Pacific.

Subgenus *Microfusus* Dall, 1916

The buccinid genera *Nassaria*, *Trajana* and *Neoterion* have recently been monographed by Cernohorsky (1981). In the meantime new information has come to hand which requires corrections to the mentioned monograph.

Nassaria*(*Microfusus*)*incerta (King, 1933) (Figs. 37,38)

1933. *Austrofusus incertus* King, Trans. Proc. N.Z. Inst. 63(3):343, pl. 35, fig. 4; 1966 Fleming, N.Z. Dept. Sci. & Ind. Res. Bull. 173:61; 1967 Beu, Trans. R. Soc. N.Z., Geol. 5(3):108.
 1969. *Benthindsia incerta* (King), Beu, N.Z. J. Geol. & Geoph. 12(2-3):493, figs. 8-10.

TYPE LOCALITY. Cliffs east of Lake Ferry, Palliser Bay, Upper Pliocene of New Zealand.

Type specimens. In N.Z. Geological Survey, Lower Hutt; length 30.0 mm, width 17.0 mm.

Beu (1969) re-assigned *Austrofusus incertus* to the genus *Benthindsia* (= *Nassaria*) and compared it with *B. miriamae* Dell, 1967 (= *Nassaria spinigera* Hayashi & Habe, 1965). Although superficially similar in sculpture to the Australian *Nassaria problematica* (Iredale), the shape of *incertus* is more like that of *Austrofusus* and the thickened, variced and denticulate outer lip and 1-2 parietal denticles and 1 basal denticle on the columella are *Nassaria* features not visible in either the incomplete holotype of *incertus* nor the specimens figured by Beu (*op.cit.*) or the specimen illustrated here (Figs. 37,38). The placement of *incertus* in *Nassaria*(*Microfusus*) is very tentative and requires confirmation.

Nassaria*(*Microfusus*) cf. *problematica (Iredale, 1936) (Fig. 39)

1936. *Benthindsia problematica* Iredale, Rec. Auckland Inst. Mus. 19(5):318, pl. 23, fig. 7.
 1981. *Nassaria*(*Microfusus*)*problematica* (Iredale), Cernohorsky, Monog. mar. Moll. No. 2:31, pl. 1, fig. 6 (protoconch); pl. 2, figs. 1, 2 (operculum); pl. 3, fig. 4 (radula); pl. 26 (shell).

TYPE LOCALITY. Off Sydney, N.S.W., Australia, 201 m.

Type specimens. In Australian Museum, Sydney, No. C-60665; length 26.1 + mm, width 13.6 mm.

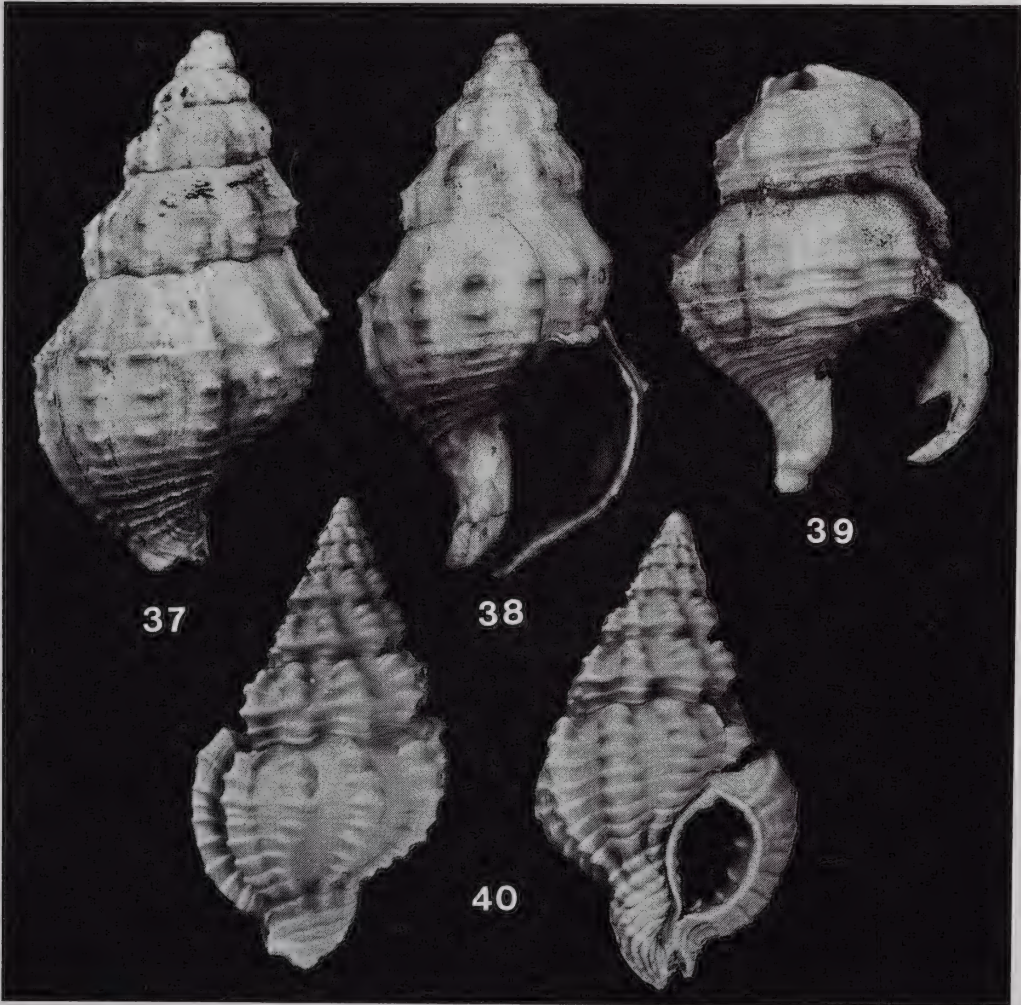
Mr B. Marshall, National Museum of N.Z., Wellington, kindly forwarded to me an incomplete specimen of a *Nassaria* species from Rangatira Knoll, N.W. of White I, 162-407 m, on loan. This particular specimen has the upper spire whorls and part of the aperture missing, but from the remaining features of shape and sculpture, the individual closely resembles the Australian species *N.(M.) problematica*. Further collection of better preserved material may confirm the existence of *N.(M.) problematica* in New Zealand waters.

Genus *Trajana* Gardner, 1948

Trajana Gardner, 1948, U.S.Geol.Surv.Prof.Pap.199-B:221. Type species by OD *T.pyta* Gardner, 1948. U.Miocene of N.Carolina and Florida.

Subgenus *Nerva* E.H.Vokes, 1969

***Trajana(Nerva)woodringi* E.H. Vokes, 1969** (Fig. 40)
 1969. *Trajana(Nerva)woodringi* E.H.Vokes, Tulane Stud.Geol.Paleont.7(1-2): 77, pl. 1, figs. 2a, b;
 1981 Cernohorsky, Monog.mar.Moll. No. 2:43.



Figs. 37-40. 37,38. *Nassaria(Microfusus)incerta* (King). Cliffs west of Whangaimoana, Paliser Bay, N.Z., NMNZ Wellington No.M-26580; 35.2 mm. 39. *N.(M.) cf. problematica* (Iredale). Rangatina Knoll, N.W. of White I, N.Z., 162-407 m, NMNZ Wellington No. M-74598; 28.8+ mm. 40. *Trajana (Neoteron)woodringi* E.H.Vokes. Holotype USNM No.646229; 14.0 mm (photo courtesy Dr E.H.Vokes).

TYPE LOCALITY. E. of Cativa, Province of Colon, Panama, Gatun formation, middle Miocene.

Type specimen. In the National Museum of Natural History, Washington, USNM No. 646229; length 14.0 mm, width 8.0 mm.

Through the courtesy of Dr E.H. Vokes, Tulane University, I was able to examine further specimens of *T.(N.)woodringi*, and the original placement by Vokes (1969) in *Trajana* is the correct one. The subgenus *Nerva* differs from *Trajana* primarily in the strongly denticulate outer lip and columella (Fig. 40).

Family NASSARIIDAE

Genus *Nassarius* Duméril, 1806

Nassarius Duméril, 1806, Zool. Analyt. p.166. Type species by SM (Froriep, 1806) *Buccinum arcularia* Linnaeus, 1758. Recent, Indo-Pacific.

Nassarius crebricostatus (Schepman, 1911) (Figs. 41-45, 48)

1911. *Nassa*(*Alectryon*, *Aciculina*) *crebricostata* Schepman, Siboga-Exped. 49d: 318, pl. 20, figs. 3a, b.

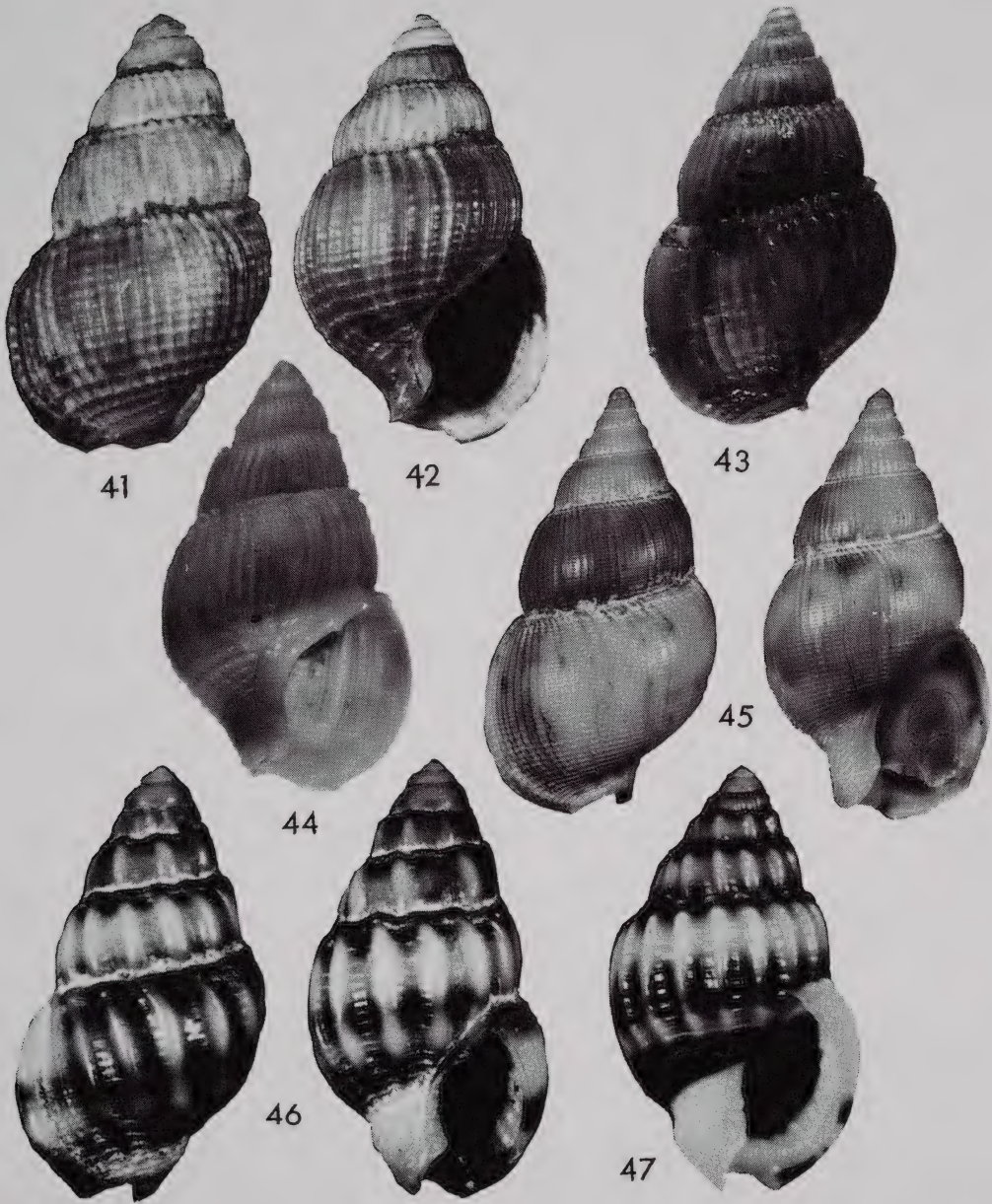
1930. *Nassarius*(*Hima*)*beccarii* Bisacchi, Ann. Mus. Civ. Stor. Nat. Genova 55: 61, textfigs. 7, 8.

TYPE LOCALITY. Molucca Passage, Indonesia, 0°11'S & 127°25'E, 397 m (*crebricostatus*); Dilemni, Red Sea (*beccarii*).

Type specimens. Syntypes of *N. crebricostatus* (Schepman) are in the Zoological Museum, University of Amsterdam (Figs. 41, 42). The holotype of *N. beccarii* Bisacchi is in the Museo Civico Storia Natural, Genoa, length 11.0 mm, width 6.0 mm (Figs. 43, 44).

The previously known distribution of *N. crebricostatus* was from the Red Sea to the Philippines and Northern Australia, from 124-472 m. Recently specimens have been obtained from Moruroa Atoll, Tuamotu Archipelago, in 350-400m, by the Museum National d'Histoire Naturelle, Paris (Fig. 45).

The species ranges in size up to 16.0 mm in length but most specimens encountered are only half this size. There are 4-5 mature, inflated, convex whorls and 3-3½ glassy, keeled embryonic whorls, axial sculpture is variable with axial ribs numbering from 25-35 in the syntypes of *N. crebricostatus* although some individuals may have as many as 50 ribs on the penultimate and 45 on the body whorl; some specimens have distinct axial ribs others weak and low ribs, and ribs may be distinct or obsolete on the body whorl. The spiral striae appear as short grooves between the ribs. The illustrated type specimens of *N. crebricostatus* and *N. beccarii* and the Moruroa specimen are not fully mature, and in mature specimens the outer lip has 7-15 denticles and the columella is either smooth or has up to 4 weak folds. The colour is off-white, fawn or pale yellow and the operculum is yellowish-brown with simple margins. The rachidians of the radula have 11 denticles, an accessory lateral plate is absent and lateral teeth are bicuspid and simple (Fig. 48).



Figs. 41-47. 41-45. *Nassarius crebricostatus* (Schepman). 41,42. Syntype ZM Amsterdam; 6.7 and 7.7 mm respectively (immature). 43,44. Holotype of *N.beccarii* Bisacchi, MCSN Genoa; 11.0 mm (immature). 45. Specimen from Moruroa Atoll, Tuamotu Archipelago, 350-400 m; 15.6 mm. 46,47. *N.tabescens* Marrat. 46. Holotype MCM Liverpool; 7.0 mm. 47. Specimen from Mahina, Tahiti, Society Is; 7.4 mm.

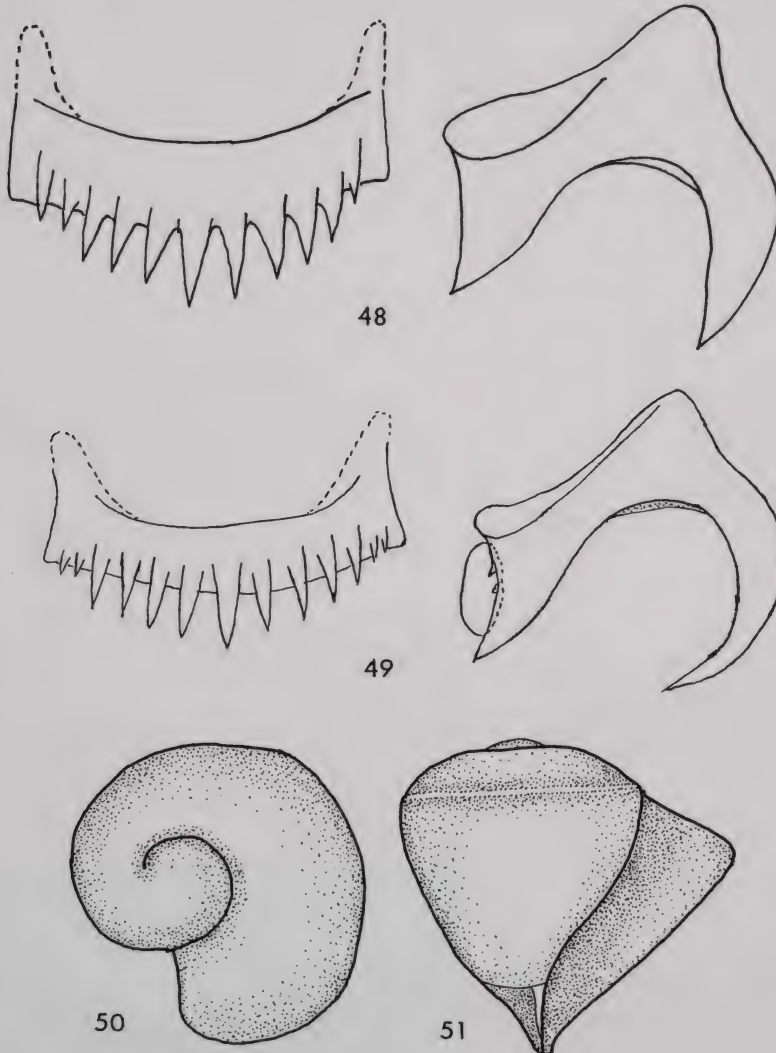
Nassarius tabescens (Marrat, 1880)

(Figs. 46,47,49-51)

1880. *Nassa tabescens* Marrat, Var. shells gen. *Nassa*, pp.74,81.

TYPE LOCALITY. None.

Type specimens. The holotype of *N. tabescens* (Marrat) is in the Merseyside County Museum, Liverpool, length 7.0 mm, width 4.0 mm. There are 3½ whorls of the teleoconch and 3¼ keeled embryonic whorls, 10 axial ribs and 6 fine spiral grooves on the penultimate and 11 ribs and 10 grooves on the body whorl, 5 basal cords, 10 denticles on the outer lip and 4 on the columella. The shell is white with rusty-brown bands (Fig. 46).



Figs. 48-51. 48. *Nassarius crebricostatus* (Schepman). Half-row of radula. 49-51. *N. tabescens* (Marrat). 49. Half-row of radula. 50,51. Top and apertural view of embryo.

The species has been described from unknown locality and the only documented recent record is from Tahiti. (Fig. 47). Eight specimens have recently been received from Mahina, Baie de Matavai, Tahiti, 12 m (leg. J.Trondle), and two of these specimens were found to have apertures filled with embryos. After extraction of the animal, further embryos were found on top of the foot, and within the mantle lobe a small cluster of undeveloped eggs was also found. There were between 50-60 embryos in each shell and some may have already been liberated by the females. The size of the translucent embryos ranged between 0.18 mm to 0.25 mm in width in a shell 7.4 mm in length, and embryos were rather broad in relationship to their length and also had a well-developed spiral keel which bore traces of a brown colour (Figs. 50,51).

The radular ribbon is 2.3 mm in length in a shell 7.0 mm in length and contains 53 rows + 3 rows of nascentes of teeth; a small accessory lateral plate is present and the inward facing cusp of the lateral tooth has 1-2 small denticles or none at all (Fig. 49).

Ovoviviparity in Nassariidae has been reported in the West African *Nassarius mueleri* (v.Maltzan,1884) [Knudsen 1956], *N.elatus* (Gould,1845) and *N.cabrierensis ovoideus* (Locard,1886) [Adam & Glibert 1974], the Caribbean *N.albus* (Say,1826) [Kaicher 1972; Cather 1973a, 1973b] and the South African *Bullia nuttalli* Kilburn,1978 (Kilburn 1978). This is the first report of ovoviviparity in a tropical Indo-Pacific nassariine species.

It should be noted that two different types of development have been reported for the Caribbean *N.albus* (Say). Specimens from Bermuda and Campeche, Mexico, were found to be ovoviviparous (Kaicher 1972; Cather 1973a,b). Bandel (1976), however, reports spawns of *N.albus* from Santa Marta, Caribbean coast of Columbia, which were composed of egg-capsules containing 60-80 eggs which hatched after 6 days when free-swimming veliger-larvae were released. This radical difference in development may be due to a misidentification of the species by Bandel.

Family MITRIDAE

Genus *Mitra* Lamarck, 1798

Mitra Lamarck,1798, Tabl.Encycl.Meth. pl.369. Type species by T *Voluta mitra* Linnaeus,1758 (Opinion 885 of ICZN). Recent, Indo-Pacific.

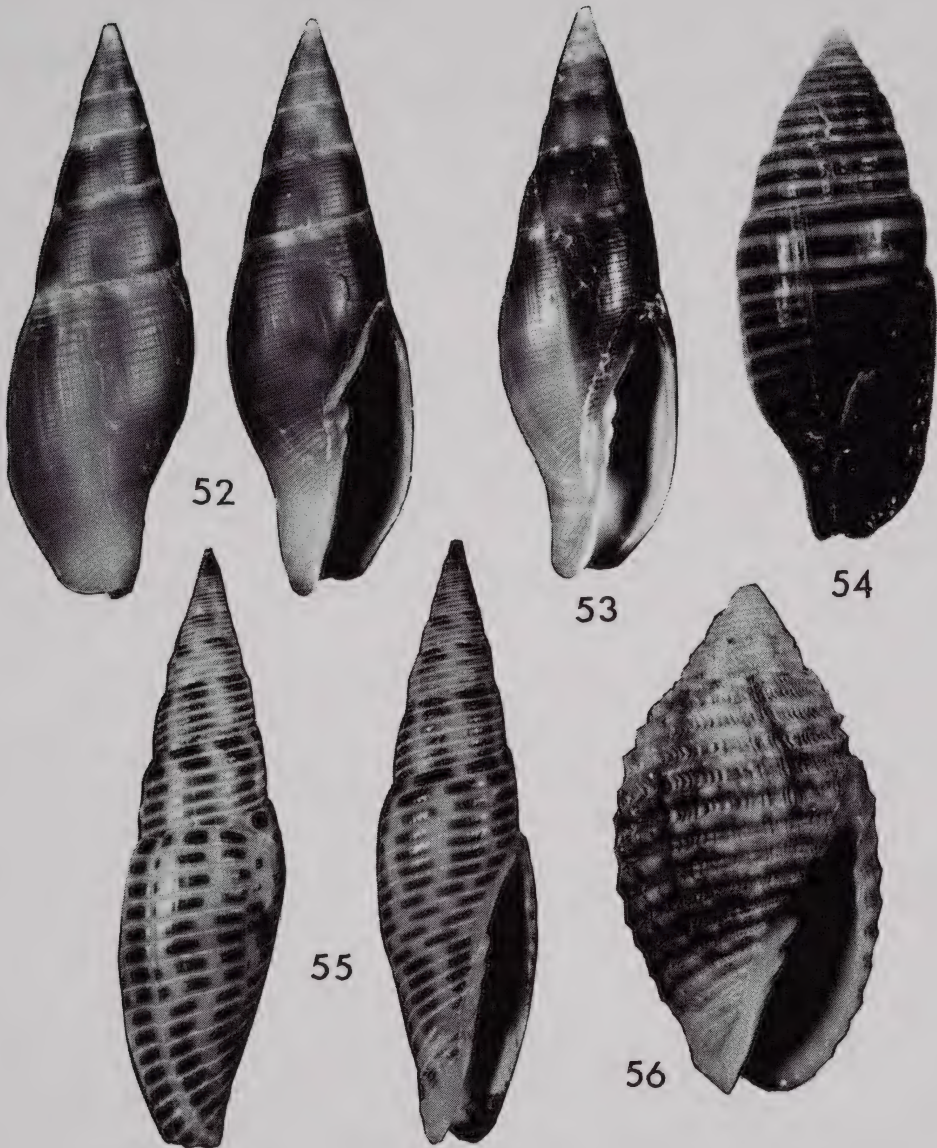
Mitra subflava (Kuroda & Habe,1971) (Figs. 52,53)

1971. *Vicimitra subflava* Kuroda & Habe, Sea shells Sagami Bay,p.189,pl.53, fig.2.

1976. *Mitra subflava* (Kuroda & Habe), Cernohorsky, Indo-Pacific Moll. 3(17):352, pl.308, fig.1.

TYPE LOCALITY. Sagami Bay, Japan.

The species has been imperfectly known since the date of description and has been considered endemic to Japan. Recent deep water dredging at Panlao, Bohol, Philippines (ex- V.Dan) has brought to light several specimens of the species (Figs. 52,53). *M.subflava* closely resembles the Austral-Neozelanic *M.carbonaria* Swainson,1822.



Figs. 52-56. 52,53. *Mitra subflava* (Kuroda & Habe). Panlao, Bohol, Philippines; 25.1 mm and 31.9 mm respectively. 54. *M. vexillum* Reeve. Glasis, Seychelles Is; 29.6 mm. 55. *Ziba rehderi* (Webb). Panlao, Bohol, Philippines; 25.6 mm. 56. *Mitra pudica* Pease. Mahina, Tahiti, Society Is; 14.7 mm.

Subgenus *Nebularia* Swainson, 1840

Nebularia Swainson, 1840, Treat. Malac. pp. 130, 319. Type species by SD (Herrmannsen, 1847)
Mitra contracta Swainson, 1820. Recent, Indo-Pacific.

***Mitra(Nebularia)vexillum* Reeve, 1884** (Fig. 54)

1844. *Mitra vexillum* Reeve, Conch. Iconica 2: pl. 23, figs. 183a, b.

1976. *Mitra(Nebularia)vexillum* Reeve, Cernohorsky, Indo-Pacific Moll. 3(17): 430, col. pl. 257, figs. 6, 7; pl. 377.

TYPE LOCALITY. Philippine Islands.

The previously known distributional range of the species was from the Philippines to the Ryukyu and Solomon Islands. The new record from Glasis, near the Tirant River, Mahe, Seychelles Islands, 8 m, under a coral dome (leg. T.R. Perrault) is a considerable westward range extension into the Indian Ocean (Fig. 54). In view of this new record, Shopland's (1902) record from "Aden" may prove to be correct after all.

***Mitra(Nebularia)pudica* Pease, 1860** (Figs. 56, 57)

1860. *Mitra pudica* Pease, Proc. Zool. Soc. Lond. pt. 28: 146 (publ. February-May, 1860).

1860. *Mitra nuxavellana* Dohrn, Proc. Zool. Soc. Lond. pt. 28: 368 (publ. August, 1860 - March, 1861).

1872. *Mitra texturata* var. *lifouana* Crosse, J. Conchyl. 20: 74; 1872 Crosse, J. Conchyl. 20: 219, pl. 13, fig. 5.

1880. *Mitra subtexturata* Garrett, J. Conch. 3: 26.

1972. *Pterygia pudica* (Pease), Cernohorsky, Marine shells Pacific 2: 173, pl. 52, fig. 1; 1974 Quirk & Wolfe, Seashells of Hawaii p. 24, fig. 15; 1979 Kay, Hawaiian mar. shells p. 307, fig. 105F; 1980 Pechar, Prior & Parkinson, Mitre shells Pacific & Indian Ocean pl. 26, figs. 4, 5.

TYPE LOCALITY. Hawaiian Is (*pudica* and *nuxavellana*); Lifu, Loyalty Is (*lifouana*); Raiatea I, Society Is (*subtexturata*).

Distribution. Tropical Pacific.

Recent authors have placed the species in the genus *Pterygia* Röding, 1798, subfamily Cyndromitridinae, containing a group of species characterized by a *Voluta*-like radula containing only a single rachidian per row. The species *Mitra pudica* has a very minute radula of 1.9 mm length in a shell 14.7 mm in length; the ribbon contains 39 rows + 3 nascentes rows of teeth and each row has 3 mitrid-like teeth (Fig. 57). The species must be re-assigned to the genus *Mitra* Lamarck, subgenus *Nebularia* Swainson.



Fig. 57. *Mitra(Nebularia)pudica* Pease. Mahina, Tahiti. Half-row of radula.

Genus *Ziba* H. & A. Adams, 1853

Ziba H. & A. Adams, 1853, Gen. Rec. Moll. 1:179. Type species by SD (Wenz, 1943) *Mitra carinata* Swainson, 1824. Recent, West Africa.

***Ziba rehderi* (Webb, 1958)**

(Fig. 55)

1958. *Mitra rehderi* Webb, Venus: Jap. J. Malac. 20(1):30, textfigs. 1, 2.
 1978. *Ziba cf. rehderi* (Webb), Cernohorsky, Rec. Auckland Inst. Mus. 15:60, figs. 11, 12.
 1979. *Mitra rehderi* Webb var., Kosuge, Bull. Inst. Malac. Tokyo 1(2):27, pl. 6, fig. 26.
 1982. *Ziba rehderi* (Webb), Cernohorsky, Bull. Mus. Nat. Hist. Nat. (4).3(4):991, pl. 1, fig. 4.

TYPE LOCALITY. Tosa, Japan, 90-100 fathoms (165-183 m).

Since the original description of *Ziba rehderi* from Japan, the species has been recorded from the Kermadec Islands, 512-585 m (Cernohorsky 1978), off Midway I, 82-265 m (Kosuge 1979) and the Mozambique Channel, 250-390 m (Cernohorsky 1982). This new record from deep water off Panlao, Bohol, Philippines (ex- V. Dan), confirms the species wide distribution (Fig. 55).

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